



Illinois Wesleyan University Digital Commons @ IWU

John Wesley Powell Student Research
Conference

1995, 6th Annual JWP Conference

Apr 22nd, 10:00 AM - 4:00 PM

An Example of Autonomous Art in Simple Deterministic Processes: Exotic Pattern Formation in Swelling Gels

Dana Deardorff

Illinois Wesleyan University

Kimberly Branshaw

Illinois Wesleyan University

Narendra K. Jaggi, Faculty Advisor

Illinois Wesleyan University

Follow this and additional works at: <http://digitalcommons.iwu.edu/jwprc>

Dana Deardorff; Kimberly Branshaw; and Narendra K. Jaggi, Faculty Advisor, "An Example of Autonomous Art in Simple Deterministic Processes: Exotic Pattern Formation in Swelling Gels" (April 22, 1995). *John Wesley Powell Student Research Conference*. Paper 29.

<http://digitalcommons.iwu.edu/jwprc/1995/posters/29>

This Event is brought to you for free and open access by The Ames Library, the Andrew W. Mellon Center for Curricular and Faculty Development, the Office of the Provost and the Office of the President. It has been accepted for inclusion in Digital Commons @ IWU by the faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.

©Copyright is owned by the author of this document.

An Example of Autonomous Art in Simple Deterministic Processes
Exotic Pattern Formation in Swelling Gels

Dana Deardorff, Kimberly Branshaw and Narendra K. Jaggi *
Physics Department, Illinois Wesleyan University

Last year, we discovered a rare and elegant coarsening mode in some gels that leads to intermediate structures that are complex and beautiful. They were discovered accidentally when a relatively large and thick cylindrical piece of the high density, crosslinked polymer was allowed to swell in water over an extended period. We have now developed an understanding of the underlying physics. Consequently, we are able to 'guide' a range of 'self organizing sculptures' whose aesthetic quality approaches art. Individual 'works' vary sufficiently so that the showing of a series of slides successfully elicits oohs and ahs from an audience. Yet, the series has unambiguous stylistic signatures that enable the identification of unique authorship, viz.. itself. This is by no means fundamentally novel. Every hiker and biker knows that natural processes can lead to beautiful structures. The joy in our work is of a slightly different variety. Our knowledge that these delicate, ornate sculptures with the majestic curves befitting Arabic calligraphy are swelling pieces of jello, gives us a sense of joy that is not quantifiable. We can guide the process just a bit so that successive patterns are sufficiently different to be interesting. But we can not predict the exact pattern that will emerge. This allows us to conduct a flirtatious dialogue with the work that is, for lack of a better word, fun.

Acknowledgment: This research was supported in part by a grant (# NAG-8-258) from NASA under the NASA/JOVE program

Note: The actual work is done by the team identified in the author list above. The abstract however was written by Narendra Jaggi who bears responsibility for it.